

Pneumococcal

We have two items of interest that concern pneumococcal vaccines. The first is recommendations concerning catch up vaccination of children whose pneumococcal conjugate vaccine doses were deferred during the PCV shortage. The second is information about the impact of pneumococcal conjugate vaccine on the incidence of invasive pneumococcal disease in the United States.

As you are aware, the demand for pneumococcal conjugate vaccine, or PCV, has exceeded the supply intermittently since the vaccine was licensed in 2000. Most recently, in February 2004, production failed to meet demand, resulting in shortages. To conserve the limited supply, CDC recommended that the fourth dose of PCV be withheld from healthy children. A few weeks later it appeared that production would be limited for several months. So CDC recommended that the third dose also be withheld.

Production problems now appear to be resolved. The supply is such that in July 2004, CDC recommended to return to a routine *three* dose schedule. Some providers might continue to have difficulties obtaining vaccine because of distribution delays. However, every effort will be made to provide sufficient vaccine to all providers.

During the shortage it was necessary to ration your available vaccine. The healthy children in your practice probably received only one or two doses. We hope that you maintained a listing of children for whom PCV was deferred. These children should now be recalled, if you have not done so already, and vaccinated as age-appropriate. Your **highest priority for catch up vaccination should be to ensure that children younger than 5 years of age at high risk for invasive pneumococcal disease are fully vaccinated.** These high risk conditions include **functional or anatomic asplenia, sickle cell disease** and other sickle hemoglobinopathies, **HIV infection, immunocompromising conditions, a cochlear implant, and chronic illnesses**, such as heart or lung disease, chronic renal failure and nephrotic syndrome. Asthma alone is not considered a high risk condition unless the child is receiving high dose steroid therapy or has obstructive lung disease.

On July 9, 2004, CDC published a summary of the pneumococcal conjugate vaccine shortage in Morbidity and Mortality Weekly Report. In this report, two new groups were added to the list of children at high risk of invasive pneumococcal disease. These groups of children are **Alaska Native and American Indian children who live in Alaska, Arizona, or New Mexico, and Navajo children who live in Colorado and Utah.** These children have a risk of invasive pneumococcal disease more than twice the national average. As a result they should receive the standard 4-dose PCV series despite the shortage.

The second priority group for catch up vaccination is **healthy children younger than 24 months of age who have received no doses of PCV**, and **infants younger than 12 months who have received less than 3 doses**.

As children get older, the number of doses needed to complete the series goes down. So as you recall children, many of them will likely need only 1 or 2 doses. In the July 9, 2004 MMWR article, CDC announced that the vaccination shortage had improved, and that providers could return to the three dose vaccination schedule. The MMWR article included a table to assist clinicians in determining the number of doses needed to catch up children who had missed doses during the shortage. The table is an expansion of the lapsed schedule table that was published in the 2000 PCV ACIP statement. The number of doses a child needs depends on their current age, and the number and timing of prior doses. We will provide a link to the July 9 MMWR article, and the catch up table, on our broadcast resources web page.

We know that the PCV shortages of the last 2 years have been very frustrating for providers. No one wants to defer doses of any vaccine. But despite the repeated shortages, there is some good news. Data collected by the Active Bacterial Core Surveillance system suggests that the conjugate vaccine is already having an impact on invasive pneumococcal disease in young children. We asked Doctor Cynthia Whitney, a medical epidemiologist in the CDC National Center for Infectious Diseases, to tell us about this exciting trend.

Since 1995, the Emerging Infections Network Program and CDC have conducted active surveillance for invasive disease caused by *Streptococcus pneumoniae* and other bacteria. The surveillance system is called Active Bacterial Core Surveillance- known as ABCs. ABCs has sites in 10 states, and includes a population of more than 20 million persons. It is an active, population based, laboratory based system. In each site, surveillance personnel contact laboratories to identify cases and collect isolates. Data are aggregated and analyzed at CDC.

The first pneumococcal conjugate vaccine was licensed in the United States in February 2000. The Advisory Committee on Immunization Practices and the American Academies of Pediatrics and Family Physicians recommended the vaccine for all children younger than 2 years of age in October 2000. Despite widespread vaccine shortages that began in 2001 and persisted into early 2003, ABCs data suggest that the conjugate vaccine is already having an impact on invasive pneumococcal disease. This graphic shows the incidence of invasive pneumococcal disease among children less than 5 years of age in 1 year increments, from 1998 through 2002. 1998 and 1999 are considered the baseline years, before licensure of conjugate vaccine. In 1998 and 1999 the highest incidence rates were among children one year of age - about 210 cases per 100,000 population, and among children younger than 1 year of age - about 170 per 100,000 population. Rates among 2, 3, and 4 year old children were lower than among younger children, but still above the overall national rate of about 23 cases per 100,000 population.

Notice the decline that occurred starting in 2000, the year the conjugate vaccine was licensed. By 2002, the rate of invasive pneumococcal disease among children younger than 2 years of age- shown here by the red and yellow lines- was about 34 cases per 100,000 population. This represents a decline in incidence of approximately 75% compared to the baseline rate. Disease among 2 years olds dropped by 72% by 2002. The rates of disease in 3 and 4 year-old children have also fallen, but less than rates among younger children. However, recall that pneumococcal

conjugate vaccine is not routinely recommended for children older than 2 years of age.

Vaccinating children may also be beneficial for adults. Studies suggest that transmission from children may be responsible for a fair amount of pneumococcal disease in adults. For example, adults living with young children have higher rates of nasopharyngeal carriage and higher risk of pneumococcal disease than those without a young child in the household. Available evidence also suggests that pneumococcal conjugate vaccine reduces nasopharyngeal carriage of pneumococcal strains contained in the vaccine, and so should indirectly reduce carriage and disease rates in close contacts of vaccinated children. ABCs data suggests that this is occurring. Here we see the incidence of invasive pneumococcal disease among adult age groups from 1998 through 2002. The incidence of disease has declined in all age groups compared to the baseline in 1998 and 1999. Among adults, the highest rates of disease are in those 65 years and older. This group also accounts for most deaths from pneumococcal disease in the US. In this age group, rates have fallen from about 60 cases per 100,000 population to about 43 cases per 100,000 population - a 29% reduction. An even larger decline has been seen among 20 to 39 year olds- shown here by the green line- whose rate has fallen 46% compared to baseline. This most likely represents reduced transmission of pneumococcus from children to their parents.

We believe that the decline in rates of disease I've described is a result of the use of pneumococcal conjugate vaccine. Historically, rates of invasive pneumococcal disease have varied somewhat from year to year. However, changes of the magnitude we've seen in the last few years are not what we would expect to see with this type of variation. Similarly, while use of pneumococcal polysaccharide vaccine has increased in the last few years, the increase in use isn't enough to account for what we are seeing. While these changes are very exciting, it's only the start to the story. We don't yet know how far disease will drop or if other pneumococcal strains will start to fill in the gaps created by the pneumococcal conjugate vaccine. We will continue to monitor the ABCs data closely to see what happens.

The information that Dr. Whitney presented included ABCs data through 2002. Since we recorded her presentation, provisional data from 2003 have become available. These data show a continuation of the same trend, with rates of invasive pneumococcal disease among 1 year old children and infants younger than one year of age reduced by 83% and 77%, respectively, compared to 1998. We have also seen a 30% to 40% reduction of rates among 20 to 39 year olds, and persons 65 and older. This reduction most likely reflects a herd effect. Vaccinated children are less likely to be colonized with pneumococcus, so their parents and grandparents are less likely to be exposed to the bacteria. This is great news. Not only are we protecting young children from invasive pneumococcal disease, we are also protecting their contacts. CDC will continue to monitor these data, and will bring you updates on future National Immunization Program broadcasts.